KBS K-12 Partnership Summer Institute 2013

Agenda Monday, June 24

8:00am Welcome and Introduction (Sarah and Sara)-Auditorium

8:30am Plenary: Carolyn Malmstrom (MSU Plant Biology Dept.)-Auditorium

9:30am Concurrent Session Teasers

9:45am break

10:00am Concurrent Sessions

Sara Garnett - Plant Biomass/Biodiv. Protocol (Stack 140)

Cara Krieg - Invertebrate Biodiversity Protocol (Stack 145)

Dustin Kincaid - Soil Protocol (Stack 141)

Jake Nalley - Landscape Protocol (Terrace Room)

12pm Lunch at McCrary

1pm Concurrent sessions

- Jenny Dauer/Carbon MSP (Terrace Room)
- Dani Fegan/Marty Buehler (Stack 140)
- Amanda Charbonneau/Terri Morton/Meredith Hawkins (Stack 138)
- Emily Dittmar/Jamie Bowman (Stack 145)

3:00pm Year in Review and Looking Ahead, snacks (Auditorium)

4:00pm adjourn

Agenda Tuesday, June 25

8:00am Welcome and Introduction (Sarah and Sara)-Auditorium

8:30am Plenary: Catherine Lindell (MSU Zoology Department)-Auditorium

9:25am Concurrent Session Teasers

9:35am break

9:45am Next Generation Science Standards Session with Nancy Karre (BCAMSC), Cheryl Hach (KAMSC), and Sara Syswerda

11:45pm Picture in back of Kellogg Manor House

12pm Lunch at McCrary

1pm Concurrent sessions

- Three resources to help students characterize local tree biodiversity (4-8th grade), Jennifer Doherty (Terrace Room)
- Susan Magnoli/Marcia Angle/Jodie Lugar-McManus (Stack 141)
- Sarah Jones/Sandy Erwin (Stack 237)
- Dani Fegan (Stack 140)

3:00pm State of the BEST plots/snacks

4:00pm adjourn, TAC meeting- Auditorium

Agenda Wednesday, June 26:

8:00am Welcome and Introduction (Sarah and Sara)-Auditorium

8:30am Plenary: Maren Friesen (MSU Plant Biology Dept.)-Auditorium

9:30am Concurrent Session Teasers

9:45am break

10am Concurrent sessions

- Amanda Charbonneau (Stack 138)
- Emily Dittmar (Stack 145)
- Susan Magnoli (Stack 141)
- Sara Garnett (Stack 140)

11:45pm Rain-alternate for picture in back of Kellogg Manor House

12pm Lunch at McCrary

1pm Concurrent sessions

- Cara Krieg (Stack 145)
- Dustin Kincaid (Stack 141)
- Jake Nalley (Terrace Room)
- Sarah Jones (Stack 237)

3:00pm Outreach at KBS (Kara Haas - auditorium)

3:20pm District Planning/snacks (auditorium)

4:00pm Evaluation, sign invoices and Adjourn

**BEST plots data entry stations will be available all three days in the auditorium.

Concurrent Session Abstracts

BEST Plots: Plant Biodiversity and Biomass With Sara Garnett, Marty Green, and Lisa Wininger, ALL LEVELS Stack 140. Both plant biodiversity and biomass are important variables to consider when thinking about the central questions of our BEST plots: can we grow our fuel (lots of plant biomass) while keeping our flowers and butterflies (biodiversity)? In this session, we will review the basic biomass and biodiversity protocols we use to collect data on our plots, explore some of the available data we've already collected, and design new questions and experiments to explore other aspects of biomass and biodiversity on our plots.

Invertebrates, going above and beyond! With Cara Krieg, Sandy Brietenbach, and Mary Grintals, ALL LEVELS Stack 145 You've collected beautiful bees and butterflies out in the plots. Now what do you do? What can this tell us? Why does it matter? In this session we'll explore stepping beyond the invertebrate biodiversity BEST plot protocol into bigger questions driven by student curiosity. We will practice identifying bugs with the invertebrate biodiversity protocol. Using this protocol as inspiration, we will then walk through an exercise that guides students through developing a new question and designing an experiment to answer that question.

Dirty deeds done dirt cheap: BEST plot protocols With Dustin Kincaid, Becky Drayton, and Liz Ratashak, MS-HS Stack 141 Soils and their microfauna provide myriad ecosystem services. These include providing the nourishment necessary to produce crops for biofuels and food. As Charles Kellogg aptly stated in the USDA Yearbook of Agriculture in 1938, "There can be no life without soil and no soil without life; they have evolved together." Thus, it is important to characterize and describe the soils in our BEST plot network. In this workshop we will describe ways to make soils an interesting topic for your students as well as explore revised protocols to describe soil types and textures, quantify soil moisture, and analyze soil pH and nitrogen content. Lastly, we will explore methods to incorporate soil data into classroom inquiry exercises and further connect soil characteristics with the patterns we see in plant biomass and diversity across the BEST plot network. Warning: sloppy lab techniques and overexcitement may result in you soiling yourself.

Uncovering the Legacy of Our Landscapes With Jake Nalley, Russ Stolberg, Cheryl Hach, and Chris Chopp, ALL LEVELS Terrace Room So BEST plots again…really? Yep, but before you skip to the next abstract let us assure you that not only are we going to run through the BEST protocol (Warning: Water Hazard!), we are also going to evaluate historical land-use changes from your school districts to your homes. Join us in developing the unique skills of measuring elevation changes with the captivating water level that will be sure to please all ages. Then, like a zombie warbler, we will look at past and present aerial images identifying how the land has changed or remained the same. We will conclude by quantifying these land changes, discussing how these changes influence the plots, and brain-storming novel questions we can address with our landscape data.

Bug Lyphe: A Next Generation-linked observational study in biodiversity With Dani Fegan and Marty Buehler, MS-HS, Stack 140 The Next Generation Science Standards will most likely be your guide very soon. Next Gen is about the art of teaching rather than just content expectations. In this session, we will collectively discuss how to teach an ecology lesson about biodiversity this artful way.

Biodiversity is discussed in many objectives ranging from genetic variation, ecosystem dynamics, functioning and resilience, to interdependent relationships in habitats. We will capture insects, an activity related to the BEST plots biodiversity protocol, as a vehicle to discuss differences in biodiversity among natural and disturbed habitats. A follow up discussion in Landscape Restoration is included.

Variety is the Spice of Life With Emily Dittmar and Jamie Bowman, MS-HS, Stack 145 This lesson introduces students to the basic logic behind Hardy-Weinberg Equilibrium. Using a deck of cards, dice, and a game of musical chairs, changes in allele and genotype frequencies will be observed across generations under scenarios that involve non-random mating, genetic drift and selection. The lesson combines student predictions, data collection, and graphing to demonstrate the importance of genetic variation.

Survivor: Extreme Environments: How invasives outwit, outplay and outlast their competitors With Amanda Charbonneau, Terri Morton, and Meredith Hawkins, MS-HS, Stack 138 In the quest for survival, species must adapt to their environment. However, their ability to adapt is limited by the amount of variation in the species. If every individual were exactly the same the species would never change. In nature, many traits and processes determine how well each individual survives and whether they produce viable offspring. This session will look at variation between and among populations, and demonstrate how an undirected process can result in directed change. Activities include a short 'variation walk' on KBS grounds and a game where you are the agent of selection and get to determine who survives.

Keeling Curve-arama: understanding what is local versus generalizable about atmospheric carbon dioxide concentrations With Jenny Dauer, MSP CARBON STRAND, MS-HS, Terrace Room Why did Keeling go to Mauna Loa, Hawaii to collect atmospheric CO_2 data? Can the data he collected tell us anything about CO_2 concentrations in Michigan? We asked students this question and got some interesting responses that reveal the difficulty in understanding what is local versus generalizable about atmospheric carbon dioxide concentrations. In this workshop we'll talk about what students think about the Keeling Curve, learn more about the Keeling Curve and how it relates to global atmospheric CO_2 concentrations. Guess the CO_2 concentration around KBS and win a door prize! (Just kidding, no door prize, but it will be fun.)

Roid Rage: Just for boys? With Sarah Jones and Sandy Erwin, Stack 237 There are many who claim men are from Mars and women are from Venus. Is this really the case, and if so, why are we different? There is evidence that man is the more aggressive sex, committing most of violent crime throughout the world. However, throughout nature we find instances of both sexes being aggressive. We will use spotted hyenas, an unusual mammal with a primate-like social system, to explore sex differences in behavior, how we can study it, and why it occurs.

Unifying Life: Placing tree diversity in an evolutionary context With Jennifer Doherty, primarily 7-10th though also 4-6th grade, Terrace Room This session is aimed at may find the first two lessons fun and relevant. In this session we will learn-by-doing three lessons from a larger curriculum, Unifying Life. This curriculum is designed to help students identify local tree biodiversity and put that diversity in an evolutionary context.

Find the acorn: To help students understand the importance of careful observation and precise language for making and communicating scientific claims. Students learn that: 1. Careful observation is important to notice key variation needed to recognize individual acorns. 2. Careful description and precise language is required to justify and communicate claims about the identify of individual acorns. 3. Careful observation and precise language are required for making and communicating scientific claims, including claims about tree identification.

Name that group: To help students understand that we use carefully observed similarities and differences to organize species into larger groups. Students learn that: 1. Plants can be grouped by flowers and fruits and to a lesser extent leaves. 2. Size is not a useful characteristic for grouping. 3. Herbaceous plants can be grouped with shrubs and trees by their flowers and fruits

Predict the appearance of the common ancestor: To help students understand that traits are a reflection of ancestry, the observation that all species in a group share characteristics is evidence that the common ancestor to that group had those characteristics.

Michigan's Most Unwanted With Susan Magnoli, Marcia Angle, and Jodie Lugar-McManus, K – 9th grade, Stack 141 Non-native, invasive species threaten Michigan's biodiversity and cost billions of dollars annually to control. We have a responsibility to teach our students the negative effects of invaders and how to identify them correctly. In this session we will take the worry out of learning to make and use identification keys. Activities include making and using a variety of keys to identify invasive species. We also have several graphing exercises involving data on invasive species that allow students to make graphs and infer information based on graphical evidence.

Participant List
Email Sara Syswerda (parrsar1@msu.edu) if you would like to be added to this list.

Comstock: Laurie Anderson, Mary Grintals, Shirley Gilland, Wendy Williams, Jan Kiino, Stacie VanZandt, Emmy Kimmer, Cathy Buscher, Canaan Groff, Mark Shenefield, Kim Sandefur, Maren Tillman, Jenny York, Caleb Fisher,

Delton-Kellogg: Lisa Kellam, Julie Renauldo, Connie High, Rob Groesbeck, Shasta Waller, Clint Waller

Galesburg-Augusta: Terri Jordan, Mathew Musialczyk,

Gobles: Becky Drayton

Gull Lake: Jennifer Boyle, Beth Rhodes, Michelle Mahar, Ashley Carroll, Blair Rodgers

Harper Creek: Erik Crooks, Meredith Hawkins, Sandy Erwin, Alissa Renner, Heather Shipley, Thomas Shipley, Amy Smith, Shel Kunji, Stacey Newton

Hastings: Marty Buehler

Kalamazoo Area Math Science Center: Cheryl Hach, Chris Chopp

Lawton: Dave Williams, Marcia Angle

Lenawee Intermediate School District:

Martin: Rob Robrahm (June 25-26)

Mattawan- Katie McKinley

Olivet: Terri Morton, Marie Toburen

Parchment: Jodie McManus

Plainwell: Marty Green, Sandy Breitenbach, Lisa Wininger

Thornapple-Kellogg: Shaun Davis, Jamie Bowman, Beth Bauer, Tina Fleming

Vicksburg: Lisa Harbour, Liz Ratashak, Dave Nette

KBS/MSU: Tom Getty, Andy Anderson, Sara Syswerda, Sarah Bodbyl Roels, Jenny Dauer, Jennifer Doherty, Hannah Miller, Catherine Lindell, Maren Friesen, Carolyn Malmstrom, Emily Dittmar, Susan Magnoli, Sarah Jones, Dani Fegan, Amanda Charbonneau, Sara Garnett, Cara Krieg, Dustin Kincaid, Jake Nalley, Nancy Karre

WMU Evaluation Staff: Bob Ruhf +1